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**REMARKS**

Claim 1 is amended; and claims 1-23 remain pending in the application.

The Examiner requests that the title be replaced with a new title which is "clearly indicative of the invention to which the claims are directed." The Examiner provided a suggested title. Applicant has amended the specification to replace the title with that suggested by the Examiner.

Claims 1 and 2 stand rejected under 35 U.S.C. § 112, as being indefinite. Applicant disagrees with the Examiner's rejection under 35 U.S.C. § 112, and requests reconsideration of such rejection.

Referring first to claim 1, the Examiner contends that the statement of "a portion further from the first electrode than the first edge region" in line 5 of the claim is indefinite in that it allegedly inappropriately defines the location for the recited portion. Applicant respectfully submits that the claim 1 recited limitation of a portion further from a first electrode than the recited edge region is definite within the meaning of § 112, in that it can be readily understood by a person of ordinary skill in the art. Specifically, claim 1 is referring to a perovskite-type dielectric material having two recited components, with one of the components being a first edge region proximate a first electrode, and another component being a recited portion further from the first electrode than the first edge region. A person of ordinary skill in the art can readily recognize that claim 1 is indicating that a recited perovskite-type dielectric material contains a portion further from the first electrode than the recited edge region, and can readily understand that the phrase "further from the first electrode than the first edge region" means that there is a greater distance between

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the recited portion and the recited first electrode than between the recited first edge region of the perovskite-type dielectric material than the first electrode.

As a person of ordinary skill in the art can readily understand the meaning of the claim 1 recited phrase of the "portion further from the first electrode than the first edge region", such phrase is definite within the meaning of 35 U.S.C. § 112. (The Examiner is referred to MPEP § 2173.02, which indicates that an Examiner should allow claims which define patentable subject matter with a "reasonable" degree of particularity and distinctness," and which further indicates that definiteness of claim language is not analyzed in a vacuum, but instead in light of several factors, including the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made.)

The Examiner's rejection of the claim 1 recited phrase referring to a "portion further from the first electrode than the first edge region" appears to be based upon the contention of the Examiner that the utilization of relative terminology within a claim renders the claim indefinite. Specifically, the Examiner appears to be contending that the recitation of a location of the claim 1 recited portion by its relative location to the claim 1 recited first edge region and first electrode is an inappropriate description of the actual location of the claim 1 recited portion. Applicant respectfully disagrees, and refers the Examiner to MPEP § 2173.05(b) which specifically states that relative terminology does not automatically render a claim indefinite under 35 U.S.C. § 112, second paragraph. Further, MPEP § 2173.05(b) emphatically states that the determination of whether the definiteness requirement of 35 U.S.C. § 112 is met is to be based on a determination of whether a person of ordinary skill in the art would be apprised of the scope of the claim. In the present case, a person of

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ordinary skill in the art can readily understand what is meant by the recited portion of the perovskite-type dielectric material being further from the recited first electrode than the recited first edge region of the perovskite-type dielectric material, and accordingly the claim 1 recited phrase of the "portion further from the first electrode than the first edge region" is definite within the meaning of 35 U.S.C. § 112.

The Examiner also indicates that claim 1 is indefinite within the meaning of 35 U.S.C. § 112, for reciting a "different amount" in line 6 of the claim. Applicant respectfully requests reconsideration of such rejection. Applicant's utilization of the term "different amount" in claim 1 indicates that an amount of crystallinity in the recited first edge region is different than that in the recited portion. The phrase "different amount" is thus relative terminology, and under the authority of MPEP § 2173.05(b) is not indefinite under 35 U.S.C. § 112 if it can be understood by a person of ordinary skill in the art. In the present case, a person of ordinary skill in the art can readily understand that an amount of crystallinity in a portion is different than the amount of crystallinity in a first edge region if either the portion or the edge region comprises more crystallinity than the other. Accordingly, the term "a different amount" in line 6 of claim 1 is not indefinite within the meaning of 35 U.S.C. § 112, and applicant respectfully requests withdrawal of the Examiner's 35 U.S.C. § 112 rejection of such term in the Examiner's next action.

The last of the Examiner's § 112 rejections is lodged against the term "less" in claim 2. Applicant respectfully requests reconsideration of such rejection. Claim 2 states that the first edge region of the claim 1 recited perovskite-type dielectric material has less crystallinity than the claim 1 recited portion of the perovskite-type dielectric material. The term "less" of claim 2 is thus a relative term, and under the authority of MPEP § 2173.05(b)

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is not indefinite if it would apprise a person of ordinary skill in the art of the scope of claim 2. In the present case, a person of ordinary skill in the art could readily recognize that a first edge region of a perovskite material has less crystallinity than a portion of the material if the edge region has more amorphous character than the portion. Since the term "less" of claim 2 can be readily understood by a person of ordinary skill in the art, the term is not indefinite within the meaning of 35 U.S.C. § 112. Applicant therefore respectfully requests withdrawal of the Examiner's § 112 rejection of claim 2 in the Examiner's next action.

For the above-discussed reasons, the Examiner's § 112 rejections of claims 1 and 2 are inappropriate, and applicant therefore requests withdrawal of such rejections in the Examiner's next action.

Claims 1-23 stand rejected as being unpatentable over Sone. Applicant has amended claim 1, and believes that such amendment places claim 1 and the claims dependent from claim 1 (claims 2-15) in condition for allowance over Sone. Applicant has reviewed claim 16, and requests reconsideration of the Examiner's rejection of claim 16 and the claims depending therefrom (claims 17-23).

Referring first to claim 1, the amended claim recites a method of forming a capacitor construction in which a perovskite-type dielectric material having two components with different crystallinity relative to one another is formed over a first capacitor electrode. The two components of the perovskite-type dielectric material are referred to as a "first edge region proximate the first electrode", and a "portion further from the first electrode than the first edge region". The claim further recites that a second capacitor electrode is formed over the perovskite-type dielectric material while the first edge region and the portion differ in crystallinity relative to one another.

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The amended claim 1 is believed allowable over the cited reference Sone for at least the reason that Sone does not disclose or suggest the claim 1 recited formation of a second capacitor electrode over a perovskite-type dielectric material while the dielectric material has a first edge region and a portion differing in crystallinity relative to one another. Applicant notes that Sone specifically discloses a process in which a perovskite-type dielectric material is deposited in an amorphous form, and then converted to a crystalline form prior to formation of a top capacitor electrode over the perovskite-type material. (See, for example, col. 3, lines 34-39 of Sone.) Sone never suggests that only a portion of the perovskite-type material is crystallized prior to formation of a capacitor electrode over the perovskite-type dielectric material, nor does Sone have any other suggestion that the disclosed perovskite-type dielectric material would contain two components differing in crystallinity relative to one another when the second capacitor electrode is formed over the perovskite-type dielectric material.

The Examiner recognizes this aspect of Sone, and states at page 3 of the Office Action "Sone does not disclose the portion having a different amount of crystallinity than the first edge region". However, the Examiner goes onto state that Sone does disclose "the thin perovskite dielectric material film is different in each area by growing of columnar grain structure". The Examiner cites column 1, lines 47-63 of Sone to support the Examiner's contention that Sone discloses a thin perovskite dielectric material different in various areas by growing of columnar grain structure.

Applicant has reviewed the text of Sone at column 1, lines 47-63 and finds no disclosure that any areas differ in crystallinity relative to one another. Sone discloses that there is a surface roughness imparted by large columnar grain structures within perovskite-

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structured films, but does not indicate that the crystallinity of the columnar grains differ from one to the other. Accordingly, applicant can find no disclosure or suggestion at column 1, lines 47-63 of Sone for a perovskite-type dielectric material having a different amount of crystallinity at one location relative to another location.

Applicant notes that in rejecting claims 3, 5, 6, 17 and 18 the Examiner appears to contend that Sone discloses perovskite-type materials having both amorphous locations and crystalline locations therein at one or more of column 3, lines 6-50; column 4, lines 16-20; column 5, lines 27-45; column 7, lines 6-20; and columns 7-8, lines 32-38. Applicant has reviewed all of the text referred to by the Examiner, as well as the remainder of Sone, and can find no disclosure or suggestion within Sone that a perovskite-type material contains both amorphous locations and crystalline locations when a capacitor electrode is formed over the perovskite-type material. Rather, the entirety of Sone appears to be indicating that a perovskite-type material is deposited in an amorphous form, and subsequently converted to a crystalline form prior to formation of a capacitor electrode over the perovskite-type material. Applicant therefore finds no suggestion or disclosure within Sone of forming a capacitor electrode over a perovskite-type dielectric material while the perovskite-type material has a different amount of crystallinity in one location relative to another; and therefore certainly finds no disclosure or suggestion in Sone of the claim 1 recited formation of a second capacitor electrode over a perovskite-type material while the material has a different amount of crystallinity in the recited edge region than a recited portion further from a first electrode than the edge region. For at least this reason, amended claim 1 is allowable over Sone, and applicant therefore requests such allowance in the Examiner's next action.

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Claims 2-15 depend from claim 1, and are therefore allowable for at least the reasons discussed above regarding claim 1. Applicant therefore requests formal allowance of claims 2-15 in the Examiner's next action.

Referring next to claim 16, such recites a method of forming a perovskite-type dielectric material over a first capacitor electrode, and forming a second capacitor electrode over the perovskite-type dielectric material, and further recites that the perovskite-type dielectric material comprises a first substantially amorphous region physically against the first electrode, a second substantially amorphous region physically against the second electrode, and a substantially crystalline region between the first and second substantially amorphous regions. For reasons similar to those discussed above regarding claim 1, applicant can find no disclosure or suggestion within Sone of a perovskite-type dielectric material between a pair of capacitor electrodes, and having locations which differ in crystallinity relative to one another. As Sone contains no disclosure or suggestion of a perovskite-type material having regions which differ in crystallinity relative to one another while the perovskite is between first and second capacitor electrodes, it is inconceivable that Sone could suggest the claim 16 recited configuration of a perovskite-type dielectric material between a pair of capacitor electrodes in which the perovskite-type dielectric material has a pair of substantially amorphous regions and a substantially crystalline region between the substantially amorphous regions. For at least this reason, claim 16 is allowable over Sone, and applicant therefore requests such allowance in the Examiner's next action.

The Examiner contends it would have been obvious to modify Sone to incorporate a second amorphous material because amorphous materials have less leakage when

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formed against a metallic electrode than substantially crystalline materials. Applicant submits that incorporation of a second amorphous material into the disclosure of Sone would not cure the defects in Sone. Specifically, Sone does not even disclose a first amorphous perovskite-type dielectric material utilized in combination with a crystalline perovskite-type dielectric material between a pair of capacitor electrodes, but instead indicates that the perovskite-type dielectric material is converted to a crystalline form prior to formation of a second capacitor electrode. Further, even assuming for the sake of argument that Sone could somehow be construed to disclose a perovskite-type dielectric material comprising an amorphous location and a crystalline location at the time that the second capacitor electrode is formed (applicant emphasizes that this assumption is purely for the sake of argument, and that applicant can find no disclosure or suggestion in Sone of formation of a capacitor electrode over a perovskite-type dielectric material comprising both crystalline and amorphous locations), the Examiner's contention would not be sufficient to support a § 103 rejection. The Examiner is reminded that under MPEP § 706.02(j) an appropriate § 103 rejection requires that a motivation to modify a reference be based upon the prior art and not on applicant's disclosure. In the present case, the only teaching of an advantage for forming an amorphous perovskite-type material between a crystalline material and atop a capacitor electrode is in applicant's disclosure. It is inappropriate for the Examiner to rely on such teaching in the § 103 rejection of claim 16, and for this additional reason, claim 16 is allowable over Sone.

Claims 17-23 depend from claim 16, and are therefore allowable for at least the reasons discussed above regarding claim 16.



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Claims 1-23 are allowable for the reasons discussed above, and applicant therefore requests formal allowance of claims 1-23 in the Examiner's next action.

Respectfully submitted,

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Inventor..... Cem Basceri  
Assignee .....Micron Technology, Inc.  
Group Art Unit.....2813  
Examiner .....Y.B. Huynh  
Attorney's Docket No. ....MI22-1731  
Title: Methods of Forming Capacitor Constructions Comprising Perovskite-Type Dielectric Materials

**VERSION WITH MARKINGS TO SHOW CHANGES MADE ACCOMPANYING  
RESPONSE TO DECEMBER 4, 2002 OFFICE ACTION**

Underlining indicates additions and strikethrough indicates deletions.

**In the Specification**

The Title is amended as follows: ~~Capacitor Constructions Comprising Perovskite-Type Dielectric Materials, and~~ Methods of Forming Capacitor Constructions Comprising Perovskite-Type Dielectric Materials.

**In the Claims**

1. (amended) A method of forming a capacitor construction, comprising:  
providing a first capacitor electrode;  
forming a perovskite-type dielectric material over the first capacitor electrode, the perovskite-type dielectric material having a first edge region proximate the first electrode and a portion further from the first electrode than the first edge region, said portion having a different amount of crystallinity than the first edge region; and

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while the first edge region and the portion differ in the amount of crystallinity relative to one another, forming a second capacitor electrode over the perovskite-type dielectric material.

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